IN THE CLAIMS

Please amend the claims as follows.

1. (Cancelled) An electro-optic modulator comprising:

a substrate;

a planar micro-cavity supported by the substrate;

a first Bragg reflector on a first side of the micro-cavity;

a second Bragg reflector on a second side of the micro-cavity;

optically isolating lateral trenches on lateral sides of the micro-cavity to increase carrier concentration in the micro-cavity; and

a modulator that modulates a refractive index of the cavity.

2. (Cancelled) The electro-optic modulator of claim 1 wherein the modulator comprises a p-i-n diode formed on top of the micro-cavity.

3. (Cancelled) The electro-optic modulator of claim 1 wherein the Bragg reflectors are distributed Bragg reflectors.

4. (Cancelled) The electro-optic modulator of claim 3 wherein the distributed Bragg reflectors comprise alternating areas having high and low refractive indices.

5. (Cancelled) The electro-optic modulator of claim 3 and further comprising a rib extending through the cavity and Bragg reflectors.

6. (Cancelled) The electro-optic modulator of claim 1 wherein the isolating trenches are filled with silicon dioxide

7. (Cancelled) The electro-optic modulator of claim 1 and further comprising an insulative layer formed on the substrate between the substrate and the micro-cavity and Bragg reflectors.

8. (Cancelled) The electro-optic modulator of claim 7 and further comprising a planar silicon dioxide layer covering the micro-cavity, Bragg reflectors and modulator to completely optically isolate the micro-cavity.

9. (Cancelled) An electro-optic modulator comprising:

a silicon substrate;

an insulator formed on the silicon substrate;

a planar micro-cavity formed on the insulator;

a first Bragg reflector formed on a first side of the micro-cavity;

a second Bragg reflector formed on a second side of the micro-cavity;

a rib extending through the cavity and Bragg reflectors;

a p-i-n diode formed on the micro-cavity that modulates a refractive index of the cavity; and

an optically isolating lateral trench in the micro-cavity on both sides of the modulator to increase carrier concentration in the micro-cavity.

10. (Cancelled) An electro-optic modulator comprising:

a rib waveguide;

an optically isolated cavity region, wherein the rib waveguide divides the cavity region into two sections;

a pair of reflectors disposed about the cavity region along the rib waveguide; and

means for modulating light passing through the rib waveguide.

11. (Cancelled) The electro-optic modulator of claim 10 wherein the means for modulating light comprises a p-i-n diode coupled to the two sections of the cavity region.

12. (Cancelled) The electro-optic modulator of claim 11 wherein the p-i-n diode comprises a p+ doped area over one section of the cavity region, and a n+ doped area over the other section of the cavity region.

13. (Cancelled) The electro-optic modulator of claim 12 wherein the doped areas are separated from a rib of the rib waveguide.

14. (Cancelled) The electro-optic modulator of claim 12 and further comprising lateral trenches extending between the reflectors and bounding the cavity region.

15. (Cancelled) The electro-optic modulator of claim 10 wherein the reflectors comprise alternating high a low refractive index sections disposed transverse to the rib waveguide.

16. (Cancelled) The electro-optic modulator of claim 12 wherein the high refractive index sections are formed of Si, and the low refractive index sections are formed of SiO_2.

17. (Cancelled) The electro-optic modulator of claim 10 and further comprising a silicon substrate supporting a buried oxide layer on which the rib waveguide, reflectors and cavity region are formed.

18. (Cancelled) The electro-optic modulator of claim 12 wherein the cavity comprises a Fabry-Perot microcavity.

19. (Cancelled) An electro-optic modulator comprising:
means for confining an optical field in a cavity;
means for confining carriers in the cavity; and
means for modulating a refractive index of the cavity.

20. (Cancelled) A method of modulating light, the method comprising:

providing light to a first end of a rib waveguide;

providing a first reflector along the waveguide;

passing the light into an optically isolated modulation cavity from the first reflector;

providing a second reflector opposite the first reflector relative to the optically isolated modulation cavity; and

modulating the light in the modulation cavity.

21. (Cancelled) The method of claim 20 wherein the light is modulated by applying a signal to a p-i-n diode formed on the cavity about the rib waveguide.

22. (Cancelled) The electro-optic modulator of claim 1 wherein the micro-cavity is passivated.

23. (Cancelled) The electro-optic modulator of claim 22 wherein the passivation comprises a thermal oxidation of silicon.

24. (Cancelled) The electro-optic modulator of claim 9 wherein the micro-cavity and lateral trenches are passivated with a thermal oxidation of silicon.

25. (New) An electro-optic modulator comprising:

a waveguide;

an optical resonant cavity optically coupled to the waveguide;

a p+ doped area formed on a first side of the optical resonant cavity; and

an n+ doped area formed on a second side of the optical resonant cavity such that the optical resonant cavity forms an intrinsic region of a P-I-N diode.

26. (New) The electro-optic modulator of claim 25 wherein carriers are injected into the optical resonant cavity by applying a voltage across the p+ and n+ doped areas to change the resonant frequency of the optical resonant cavity.

27. (New) The electro-optic modulator of claim 25 wherein the n+ and p+ areas are electrically isolated.

28. (New) The electro-optic modulator of claim 27 and further comprising lateral trenches formed adjacent the n+ and p+ areas.

29. (New) The electro-optic modulator of claim 27 wherein the n+ and p+ areas are formed on an insulator.

30. (New) The electro-optic modulator of claim 25 wherein the optical resonant cavity comprises orthogonal trenches formed at both ends of the optical resonant cavity to reflect light back into the optical resonant cavity.

31. (New) The electro-optic modulator of claim 25 wherein the injection of carriers into the optical resonant cavity by applying a voltage across the p+ and n+ doped areas changes the concentration of free carriers in the optical resonant cavity.

32. (New) The electro-optic modulator of claim 31 wherein the concentration of free carriers in the optical resonant cavity is changed without significant heating of the cavity.

33. (New) The electro-optic modulator of claim 25 wherein optical resonant cavity comprises a planar micro cavity.

34. (New) The electro-optic modulator of claim 33 wherein the planar micro cavity comprises a rib waveguide.

35. (New) The electro-optic modulator of claim 34 wherein the optical resonant cavity comprises a distributed Bragg reflector formed at both ends of the rib waveguide.

36. (New) An electro-optic modulator comprising:
an optical resonator cavity having free carriers; and
means for controlling the concentration of free carriers in the optical resonator cavity.

37. (New) The electro-optic modulator of claim 36 wherein the means for controlling the concentration of free carriers in the optical resonator cavity comprises a p+ doped area and a n+ doped area on opposite sides of the optical resonator cavity such that a p-i-n diode is formed with the optical resonator cavity comprising the intrinsic region of the p-i-n diode.

38. (New) The electro-optic modulator of claim 37 wherein carriers are injected into the optical resonator cavity by applying a voltage across the p+ and n+ doped areas changes the resonant frequency of the optical resonator cavity.

39. (New) The electro-optic modulator of claim 37 wherein the n+ and p+ areas are electrically isolated.

40. (New) The electro-optic modulator of claim 39 and further comprising lateral trenches formed adjacent the n+ and p+ areas.

41. (New) The electro-optic modulator of claim 39 wherein the n+ and p+ areas are formed on an insulator.

42. (New) The electro-optic modulator of claim 36 wherein the optical resonator cavity further comprises orthogonal trenches formed at both ends of the optical resonator cavity to reflect light back into the optical resonator cavity.

43. (New) The electro-optic modulator of claim 36 wherein the injection of carriers into the optical resonator cavity by applying a voltage across the p+ and n+ doped areas changes the concentration of free carriers in the optical resonator cavity.

44. (New) The electro-optic modulator of claim 43 wherein the concentration of free carriers in the optical resonator cavity is changed without significant heating of the cavity.

45. (New) The electro-optic modulator of claim 37 wherein optical resonator cavity comprises a planar micro cavity.

46. (New) The electro-optic modulator of claim 45 wherein the planar micro cavity comprises a rib waveguide.

47. (New) The electro-optic modulator of claim 46 wherein the optical resonator cavity comprises a distributed Bragg reflector formed at both ends of the rib waveguide.

48. (New) An electro-optic modulator comprising:

a waveguide;

an optical resonant cavity having a rib waveguide formed of silicon on insulator optically coupled to the waveguide and formed with a pair of optical reflectors coupled to each end of the rib waveguide;

a p+ doped area formed on a first side of the rib waveguide; and

an n+ doped area formed on a second side of the rib waveguide such that the rib waveguide forms an "i" portion of a P-I-N diode adapted to modulate carrier concentration within the optical resonant cavity to modulate light within the optical resonant cavity.